

Remarks

Upon entry of the foregoing amendment, claims 6-10 are pending in the application, with claim 8 being the independent claim. Claim 5 was previously sought to be cancelled, and claims 1-4 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. New claims 8-10 are sought to be added. Support for new claims 8-10 can be found in the originally filed claims 1-4 and the specification at page 13, lines 23-30; page 20, lines 8-18; and the table at pages 26 and 27. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendments and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objection and rejection and that they be withdrawn.

I. Supplemental Information Disclosure Statement

Applicants note that a Second Supplemental Information Disclosure Statement is submitted accompanying the Amendment and Reply. Applicants respectfully request the Examiner initial and return a copy of Information Disclosure Statement Forms.

II. Objection to the Abstract

The Abstract is objected by the Examiner due to the word "comprising." (Office Action, page 3.) In view of the amendment to the abstract, the objection has been fully accommodated.

III. Rejection under 35 U.S.C. § 103(a)

Claims 1-4, 6 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Lahm *et al.* (WO 03/015519 A1) ("Lahm") in view of Brück *et al.* (U. S. Patent No.

6,576,661) ("Brück"), as evidenced by EXTOUNET. (Office Action, page 4.)

Applicants respectfully traverse the rejection.

The cancellation of claims 1-4 renders the rejection of claim 1-4 moot.

B. Prima facie Case of Obviousness Has Not Been Established

The examiner asserts that:

[A] skilled artisan would have envisaged the instantly claimed combination composition, comprising the instant compound of Formula (I) and chlorpyrifos, as disclosed by Lahm *et al.*, in combination with methiocarb, as disclosed by Brück *et al.*, as evidenced by the EXTOUNET article. One of ordinary skill in the art would have been motivated to combine the teachings of the aforementioned references when seeking a combination composition for controlling an invertebrate pest, wherein the insecticidal and acaricidal action of said combination considerably exceeds the total of the actions of the individual active compounds. It would have been obvious to one of ordinary skill in the art, at the time of the invention, because the combined teachings of the prior art are fairly suggestive of the claimed invention.

(Office Action, page 10.) Applicants respectfully disagree.

Applicants reiterate that for the reasons detailed in Applicants' Amendment and Reply of November 26, 2008, the Examiner has not established a *prima facie* case of obviousness of the present claims 6-10.

Specifically, as discussed previously, Lahm generally discloses a genus of anthranilamide compounds of Formula 1. (Lahm at page 2, lines 1-8.) Lahm also discloses a large number of compounds that are encompassed by Formula 1, and one of them is Applicants' elected compound, *i.e.*, the compound I-1-4. (*Id.* at pages 37-48, Table 1; and pages 63-67, Index Table A.) Lahm then generally discloses that the anthranilamide compounds of Formula 1 can be combined with one or more other biologically active compounds or agents, encompassing hundreds of insecticides,

fungicides, nematocides, bactericides, acaricides, growth regulators, etc. (*Id.* at page 59, line 4, through page 60, line 20.)

Even though Lahm claims a composition comprising an anthranilamide compound of general Formula 1 and at least one additional biologically active compounds selected from the group consisting of over 100 compounds, including chlorpyrifos (*see* Lahm, claim 12) as pointed out by the Examiner, Lahm ***does not*** disclose a composition consisting essentially of a synergistically effective mixture of compounds of the formula (I-1) (represented by compound I-1-4) and one or more insecticidally active compounds selected from the group consisting of chlorpyrifos, acephate, methamidophos, carbaryl, methiocarb and thiodicarb as required by present claims 6-10.

In addition, present claims 6-10 recite the mixing ratio of the compound of the formula (I-1) to chlorpyrifos, acephate, methamidophos, carbaryl, methiocarb and/or thiodicarb. Lahm is completely silent with respect to the mixing ratios as recited in present claims 6-10.

Brück does not cure the deficiencies of Lahm. As discussed previously, Brück discloses a combination of a cyclic ketonol compound, and one or more of (a) (thio)phosphates, (b) pyrethroids, (c) carbamates, (d) benzoylureas, (e) macrolids, (f) diacylhydrazines, (g) halogenocycloalkanes, (h) acaricides, or (i) other compounds. Chlorpyrifos is disclosed as an example of (thio)phosphates, and methiocarb is disclosed as examples of carbamates. (Brück, cols. 1-22.) Brück also discloses that the mixing ratio for the cyclic ketonol compound to chlorpyrifos or methiocarb is 10:1 to 1:10, especially 5:1 to 1:5. (*Id.* at col. 23, lines 13 and 43.)

According to the Examiner,

Brück *et al.* fail to disclose the instant Formula (I), but do disclose an active ingredient combination having insecticidal and acaricidal characteristics. This reference serves merely to teach the inclusion of conventional (thio)phosphates and/or carbamates and their respective amounts.

(Office Action, page 8.) Applicants respectfully submit that Brück's cyclic ketonol compound is not only structurally completely different from Lahm's anthranilamide compound, but also acts in a completely differently mode as compared to Lahm's anthranilamide compound. Specifically, Lahm's anthranilamide compound is a systemic pesticide, while Brück's cyclic ketonol compound is a contact pesticide. A systemic insecticide is an insecticide whose mode of action is via uptake into a plant, entering the insect when the plant is consumed. A contact insecticide is toxic to insects brought into direct contact, and therefore its efficacy is often related to the amount of the pesticide applied. In light of the difference between Brück's cyclic ketonol compound and Lahm's anthranilamide compound, a person of ordinary skilled in the art would not have considered Brück's cyclic ketonol compound and Lahm's anthranilamide compound are equivalent or interchangeable with respect to the mixing partners and the mixing ratios as asserted by the Examiner.

Under *KSR International Co. v. Teleflex, Inc.*, 127 S.Ct. 1727, 82 U.S.P.Q. 2d 1385, 1741 (USSC) (2007), "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art." Rather, there must be a reason or rationale behind an obviousness determination and "this analysis should be made explicit." *Id.* Hence, under KSR, the mere fact that the individual elements, i.e., compound (I-1-4), chlorpyrifos, methiocarb,

and mixing ratio for the cyclic ketonol compound to chlorpyrifos or methiocarb, were independently known in the art does not render the present claims 6-10 obvious. The Examiner used impermissible hindsight analysis to piece together isolated elements taken from Lahm's laundry list of secondary mixing partners, and Brück's completely different primary ingredient, its secondary mixing partners and mixing ratios, with the aid of Applicants' disclosure to arrive at the presently claimed composition.

In sum, there is nothing in any of the cited references that would have provided a reason for making the composition as recited in the present claims 6-10. Accordingly, the Examiner has not established a *prima facie* case obviousness of claims 6-10.

The Examiner also cites *In re Kerkhoven* to support the rejection. According to the Examiner:

It is *prima facie* obvious to use in combination two or more ingredients that have previously been used separately for the same purpose. *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

(Office Action, page 9.) Applicants respectfully submit that the facts in the present case is distinguishable from *In re Kerkhoven*. *In re Kerkhoven* dealt with the patentability of claims directed to a process of preparing a spray-dried detergent by mixing together spray-dried nonionic detergents and anionic detergents. According to the United States Court of Customs and Patent Appeals, the claimed invention "require no more than the mixing together of two conventional spray-dried detergents." *Id.* at 850, 205 U.S.P.Q. at 1072. Applicants note that the claims in *In re Kerkhoven* only require combining a spray-dried nonionic detergent with a spray-dried anionic detergent, and **does not** require combining a **specific** spray-dried nonionic detergent with a specific spray-dried anionic detergent. Hence, the holdings of *In re Kerkhoven* cannot be broadly applied to

presently claimed composition because, contrary to the facts in *In re Kerkhoven*, present claims 6-10 require a composition consisting essentially of a mixture of compounds of the formula (I-1) and at least one of the six specifically selected insecticidally active compounds within the specified range of mixing ratio to achieve a synergic effect. Thus, the facts in the present case is distinguishable from *In re Kerkhoven*.

Accordingly, for at least these reasons detailed above, the present claims 6-10 are not *prima facie* obvious over Lahm in view of Brück, as evidenced by EXTTOXNET.

B. The Record Provides Evidence of Unexpected Results That Rebuts Any Prima facie Case of Obviousness

As discussed above, the Examiner has not established a *prima facie* case of obviousness of present claims 6-10. Moreover, the record demonstrates that *prima facie* obviousness, even if it were established, is rebutted by the synergistic effects obtained with the claimed composition. Synergistic effects have long been recognized as an indicator of non-obviousness. *See In Re Luvisi*, 144 U.S.P.Q. 646, 651-653 (CCPA 1965); *In re Lemin*, 408 F.2d 1045, 1049 (CCPA, 1969).

(i) Method of Demonstrating Synergism

The Board has recognized that there are many appropriate methods of demonstrating synergism. *See Ex parte Quadranti*, 25 U.S.P.Q.2d 1071, 1072-1073 (1992) ("There are undoubtedly many appropriate methods of demonstrating synergism. In each case, however, the facts shown must be analyzed to determine whether the method chosen in that case has in fact clearly and convincingly demonstrated the existence of synergism or, more generally speaking, an unobvious result.").

For example, synergism is shown where "the combined action of two or more agents . . . that is greater than the sum of the action of one of the agents used alone." *In Re Luvisi*, 144 U.S.P.Q. at 652.

Synergism of a given composition containing two or more active fungicidal compounds can be demonstrated by comparing the observed fungicidal activity of the composition to the calculated fungicidal activity according to the Colby formula. If the observed fungicidal activity is greater than that calculated, then the composition has a synergistic effect. Specifically, for a composition that contains two active fungicidal compounds, the calculated fungicidal activity is:

$$E = X + Y - \frac{X \bullet Y}{100}$$

wherein X denotes the efficacy when employing active compound A in a concentration of m ppm,¹ Y denotes the efficacy when employing active compound B in a concentration of n ppm, E denotes the efficacy when employing active compounds A and B in a concentrations of m and n ppm. (Specification at page 41, line 29, through page 42, line 12.)

(ii) Synergistic Effect Presented in the Specification

The specification includes one example, *Myzus persicae* test, to demonstrate the synergistic effect obtained with the presently claimed composition. (Specification at page 43, Example A and Table A.)

¹ The unit "ppm" means parts per million.

In this study, cabbage leaves that were infested by the green peach aphid (*Myzus persicae*) were dipped into a preparation of compound (I-1-9) (4 ppm), or chlorpyrifos (0.8 ppm), individually, or into a preparation of the claimed composition (4 ppm compound (I-1-9) + 0.8 ppm chlorpyrifos, wherein the ratio of compound (I-1-9) to chlorpyrifos was 5:1 (4 ppm: 0.8 ppm)). The efficacy of insect control was evaluated 1 day after the treatment. (*Id.*)

As shown in Table A, when applied individually, efficacies of 0% and 65%² were observed for compound (I-1-9) and chlorpyrifos, respectively. However, an efficacy of 85% was observed when the claimed composition was applied. Thus, the efficacy of the claimed composition (85%) was ***much greater than*** the sum of the efficacy of compound (I-1-9) and chlorpyrifos applied individually (0% + 65% = 65%). Therefore, the claimed composition (mixing ratio of compound (I-1-9) to chlorpyrifos = 5:1) has a synergistic effect in controlling *Myzus persicae*, according to the definition of synergism in *In Re Luvisi*.

Alternatively, according to Colby formula, the calculated efficacy of the claimed composition is 65%. However, the observed efficacy of the claimed composition was 85%, which is ***much greater*** than the calculated efficacy. Therefore, the claimed composition (mixing ratio of compound (I-1-9) to chlorpyrifos = 5:1) has a synergistic effect in controlling *Myzus persicae*, according to Colby formula.

² An efficacy of 0% indicates that none of the aphids were killed, and an efficacy of 100% indicates that all the aphids were killed.

(iii) Synergistic Effect Presented in the Declaration

Additional evidence of synergistic effects obtained with presently claimed compositions is provided in the accompanying Declaration by Dr. Wolfram Andersch³ under 37 C.F.R. § 1.132 submitted herewith.

(a) *Myzus persicae* test

In the study described in Example A of the Declaration, cabbage leaves that were infested by *Myzus persicae* were sprayed with preparations of tested compounds individually, or with preparations of the claimed compositions. The efficacy of insect control was evaluated after specified days of the treatment (*e.g.*, 1 day or 6 days after the treatment). (Declaration, Example A and Tables A1 and A2.)

As shown in Table A1, for example, when applied individually at 0.8 g/ha of compound (I-1-52) or 4 g/ha of acephate,⁴ efficacies of 0% and 0% were observed for compound (I-1-52) and acephate, respectively. However, an efficacy of 30% was observed when the claimed composition (0.8 g/ha compound (I-1-52) + 4 g/ha acephate, wherein the ratio of compound (I-1-52) to acephate was 1:5 (0.8 g/ha: 4 g/ha)) was applied. Thus, the efficacy of the claimed composition (30%) was ***much greater than*** the sum of the efficacy of compound (I-1-52) and acephate applied individually (0% + 0% = 0%). Therefore, the claimed composition (mixing ratio of compound (I-1-52) to acephate = 1:5) has a synergistic effect in controlling *Myzus persicae*, according to the definition of synergism in *In Re Luvisi*.

³ Dr. Wolfram Andersch, an inventor of the above-captioned application, is an employee of Bayer CropScience AG, the assignee of the above-captioned application.

⁴ The unit "g/ha" means gram per hectare.

Alternatively, according to Colby formula, the calculated efficacy of the claimed composition is 0%. However, the observed efficacy of the claimed composition was 30%, which is ***much greater*** than the calculated efficacy. Therefore, the claimed composition (mixing ratio of compound (I-1-52) to acephate = 1:5) has a synergistic effect in controlling *Myzus persicae*, according to Colby formula.

Similarly, as shown in Tables A1 and A2, at the mixing ratios of 1:5 (compound of the formula (I-1) : compound of group 2 or group 3), the claimed compositions containing ***compound I-1-1 and acephate, compound I-1-52 and carbaryl, compound I-1-1 and methamidophos, compound I-1-12 and acephate, compound I-1-1 and carbaryl, compound I-1-54 and chlorpyrifos, compound I-1-24 and chlorpyrifos, compound I-1-4 and chlorpyrifos, compound I-1-52 and methamidophos, compound I-1-24 and thiodicarb, and compound I-1-12 and thiodicarb*** have synergistic effects in controlling *Myzus persicae*, according to the definition of synergism in *In Re Luvisi* and Colby formula.

(b) *Phaedon cochleariae* test

In the study described in Example B of the Declaration, cabbage leaves were first sprayed with preparations of tested compounds individually, or with preparations of the claimed compositions. The cabbage leaves were then infested with larvae of the mustard beetle (*Phaedon cochleariae*), and the efficacy of insect control was evaluated 6 days after the inoculation. (Declaration, Example B and Table B 1.)

As shown in Table B1, for example, when applied individually at 0.16 g/ha of compound (I-1-52) or 0.8 g/ha of acephate, efficacies of 50% and 0%⁵ were observed for compound (I-1-52) and acephate, respectively. However, an efficacy of 67% was observed when the claimed composition (0.16 g/ha compound (I-1-52) + 0.8 g/ha acephate, wherein the ratio of compound (I-1-52) to acephate was 1:5 (0.16 g/ha: 0.8 g/ha)) was applied. Thus, the efficacy of the claimed composition (67%) was much **greater than** the sum of the efficacy of compound (I-1-52) and acephate applied individually (50% + 0% = 50%). Therefore, the claimed composition (mixing ratio of compound (I-1-52) to acephate = 1:5) has a synergistic effect in controlling *Phaedon cochleariae*, according to the definition of synergism in *In Re Luvisi*.

Alternatively, according to Colby formula, the calculated efficacy of the claimed composition is 50%. However, the observed efficacy of the claimed composition was 67%, which is **much greater** than the calculated efficacy. Therefore, the claimed composition (mixing ratio of compound (I-1-52) to acephate = 1:5) has a synergistic effect in controlling *Phaedon cochleariae*, according to Colby formula.

Similarly, as shown in Table B1, at the mixing ratios of 1:5 (compound of the formula (I-1) : compound of group 2 or group 3), the claimed compositions containing **compound I-1-1 and acephate, compound I-1-4 and acephate, compound I-1-24 and carbaryl, compound I-1-4 and carbaryl, compound I-1-4 and methamidophos, compound I-1-24 and thiodicarb, and compound I-1-12 and thiodicarb** have synergistic effects in controlling *Phaedon cochleariae*, according to the definition of synergism in *In Re Luvisi* and Colby formula.

⁵ An efficacy of 0% indicates that none of the beetle larvae were killed, and an efficacy of 100%

(c) *Spodoptera Frugiperda* Test

In the study described in Example C of the Declaration, cabbage leaves were first sprayed with preparations of tested compounds individually, or with preparations of the claimed compositions. The cabbage leaves were then infested with larvae of the fall army worm (*Spodoptera frugiperda*). The efficacy of insect control was evaluated after specified days of the treatment (*e.g.*, 2 days or 6 days after the treatment). (Declaration, Example C and Tables C1 and C2.)

As shown in Table C1, for example, when applied individually at 0.8 g/ha of compound (I-1-54) or 4 g/ha of acephate, efficacies of 67% and 0%⁶ were observed for compound (I-1-54) and acephate, respectively. However, an efficacy of 100% was observed when the claimed composition (0.8 g/ha compound (I-1-54) + 4 g/ha acephate, wherein the ratio of compound (I-1-54) to acephate was 1:5 (0.8 g/ha: 4 g/ha)) was applied. Thus, the efficacy of the claimed composition (100%) was ***much greater than*** the sum of the efficacy of compound (I-1-54) and acephate applied individually (67% + 0% = 67%). Therefore, the claimed composition (mixing ratio of compound (I-1-54) to acephate = 1:5) has a synergistic effect in controlling *Spodoptera frugiperda*, according to the definition of synergism in *In Re Luvisi*.

Alternatively, according to Colby formula, the calculated efficacy of the claimed composition is 67%. However, the observed efficacy of the claimed composition was 100%, which is ***much greater than*** the calculated efficacy. Therefore, the claimed

indicates that all the beetle larvae were killed.

⁶ An efficacy of 0% indicates that none of the caterpillars were killed, and an efficacy of 100% indicates that all the caterpillars were killed.

composition (mixing ratio of compound (I-1-52) to acephate = 1:5) has a synergistic effect in controlling *Spodoptera frugiperda*, according to Colby formula.

Similarly, as shown in Tables C1 and C2, at the mixing ratios of 1:5 (compound of the formula (I-1) : compound of group 2 or group 3), the claimed compositions containing *compound I-1-4 and acephate, compound I-1-54 and carbaryl, compound I-1-24 and carbaryl, compound I-1-54 and chlorpyrifos, compound I-1-52 and acephate, compound I-1-24 and chlorpyrifos, compound I-1-12 and chlorpyrifos, compound I-1-4 and chlorpyrifos, compound I-1-52 and methamidophos, compound I-1-24 and methamidophos, compound I-1-12 and methamidophos, and compound I-1-54 and thiodicarb* have synergistic effects in controlling *Spodoptera frugiperda*, according to the definition of synergism in *In Re Luvisi* and Colby formula.

In summary, in the present application, Applicants have demonstrated synergistic effect of the claimed compositions in controlling different insects, by more than one appropriate method. The synergistic effects rebut the obviousness rejection of present claims 6-10, assuming a *prima facie* case of obviousness could have been established.

(iv) Brück's General Statement of Synergy

The Examiner states that:

Additionally, Brück *et al.* disclose that surprisingly, the insecticidal and acaricidal action of the active compound combination according to the invention considerably exceeds the total of the actions of the individual active compounds, and a true synergistic effect, which could have been predicted, exist.

(Office Action, page 8) (internal citation omitted). The Examiner appears to take the position that the claimed compositions are obvious because Brück discloses synergistic

combinations. Applicants respectfully disagree. *See In Re Luvisi*, 144 U.S.P.Q. (BNA) 646 (C.C.P.A. 1965).

In Re Luvisi dealt with the patentability of claims directed to a dustless, free-flowing granule composition, process for preparing granule composition and method of use, comprising a combination of (i) 1-alkyl-3-phenyl substituted urea (*e.g.*, 3-pchlorophenyl-1,1-dimethyl urea, trade name "CMU"), and (ii) hydrated alkali metal borate, in the ratio of 1:9 to 1:25. *Id.* at 647-648. The prior art Ryker *et al.* discloses substituted ureas (including CMU) as herbicides and combinations of substituted ureas with other herbicidal active compounds (a laundry list of compounds including sodium borates) "to give synergistic herbicidal results." *Id.* at 649.

The Board of Patent Appeals and Interferences (BPAI) found that the claims obvious in view of the prior art references. On appeal, United States Court of Customs and Patent Appeals disagreed and concluded from the evidence of record that the claimed invention were not obvious. The court held:

*We do not accept the notion that every suggestion of synergism in the art coupled with a finding of synergism in the practice of the invention automatically compels a conclusion of obviousness. "Synergism" is a very broad term and means "the combined action of two or more agents * * * that is greater than the sum of the action of one of the agents used alone * * *." Webster's Third New International Dictionary (1961). The definition says nothing at all about how much "greater." Hence, a synergistic composition could well be unobvious even though "synergism" is suggested in the prior art. For example, the claimed compositions may be many times more synergistic that [sic] any of the prior art compositions.*

Id. at 652 (emphasis added).

Thus, in view of *In Re Luvisi*, Brück's general statement of synergy does not in and of itself compel a finding the obviousness of presently claimed compositions. As

explained in detail above, Applicants have demonstrated the synergistic effects obtained from the claimed compositions in controlling different insects, by more than one appropriate method. Moreover, in many instances, an efficacy was achieved which was much greater than what would have been expected.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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